Effect of Hyaluronic Acid on reconstruction of deficient interdental papillae: in vitro and in vivo

論 文 内 容 要 旨

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Background: Deficiency of the interdental papillae is a challenge from the esthetic perspective. Hyaluronic acid (HA) filler is a soft tissue filler that is widely used in facial filling and can be employed to reconstruct deficient interdental papillae. Recently, an increasing number of case reports have described this method as minimally invasive and predictable. However, there have been few studies on the absorption of HA filler and the effect of HA on gingival cells. The purpose of this study was to observe the long-term behavior of HA filler and the effect of HA on human gingival fibroblasts (HGFs).

Methods: Fifteen Sprague-Dawley (SD) rats were used to test the long-term behavior of HA filler in vivo. Hematoxylin eosin (HE) staining was used to observe the HA filler in gingival tissue. HA was diluted to 5% and 10% concentration to culture human gingival fibroblast (HGF) in vitro test, compared to the control group in basal culture. The morphology and proliferation of HGF were testified by scanning electron microscope and metabolic activity cell counting kit. Furthermore, the effect of HA on target gene and protein expression associated with gingival regeneration, including vascular endothelial growth factor (VEGF), collagen1 (COL1A2), bone morphogenetic protein-2 (BMP-2), wnt1-inducible signaling pathway protein-1 (WISP-1/CCN4), was assessed by reverse transcription polymerase chain reaction (real-time PCR), and western blotting.

Results: The degradation of HA filler in gingival tissue has individual difference. After 6 months, HA were absorbed except one rat. And HA did not affect the morphology and proliferation of HGF. 5% HA promoted VEGF, COL1A2, BMP-2, WISP-1/CCN4 genes expression at 7 days compared with control group and 10% HA. 5% HA also promoted Col1A2 protein expression at 3 days, promoted BMP-2 protein expression at 7 and 14 days, WISP-1/CCN4 protein expression at 14 days. Whereas VEGF protein expression was promoted by 10% at 3 days.

Conclusions: HA filler long term existence did no harm to gingival tissue. The absorption of HA filler has individual difference. Although HA showed no positive effects on cell proliferation, it had a positive influence on gingival tissue repair by enhancing related gene and protein expression. More in vitro studies are necessary to further investigate the effect of HA on regeneration of the interdental papillae.